



DEPARTMENT OF THE AIR FORCE  
59TH MEDICAL WING (AETC)  
JOINT BASE SAN ANTONIO - LACKLAND TEXAS

6 MAY 2016

MEMORANDUM FOR ST

ATTN: KEVIN WU

FROM: 59 MDW/SGVU

SUBJECT: Professional Presentation Approval

1. Your paper, entitled **Graft-Impacted Tacrolimus-Eluting Hydrogels Prolong Survival After Vascularized Composite Allografts** presented at/published to **Association of Surgeons Great Britain and Ireland 11-13 May 2016** with MDWI 41-108, and has been assigned local file #**16194**.
2. Pertinent biographic information (name of author(s), title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are 59 MDW staff member, we can forward your request for funds to the designated wing POC.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

Linda Steel-Goodwin

LINDA STEEL-GOODWIN, Col, USAF, BSC  
Director, Clinical Investigations & Research Support

## PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

### INSTRUCTIONS

USE ONLY THE MOST CURRENT 59 MDW FORM 3039 LOCATED ON AF E-PUBLISHING

1. The author must complete page two of this form:
  - a. In Section 2, add the funding source for your study [ e.g., 59 MDW CRD Graduate Health Sciences Education (GHSE) (SG5 O&M); SG5 R&D; Tri-Service Nursing Research Program (TSNRP); Defense Medical Research & Development Program (DMRDP); NIH; Congressionally Directed Medical Research Program (CDMRP) ; Grants; etc.]
  - b. In Section 2, there may be funding available for journal costs, if your department is not paying for figures, tables or photographs for your publication. Please state "YES" or "NO" in Section 2 of the form, if you need publication funding support.
2. Print your name, rank/grade, sign and date the form in the author's signature block or use an electronic signature.
3. Attach a copy of the 59 MDW IRB or IACUC approval letter for the research related study. If this is a technical publication/presentation, state the type (e.g. case report, QA/QI study, program evaluation study, informational report/briefing, etc.) in the "Protocol Title" box.
4. Attach a copy of your abstract, paper, poster and other supporting documentation.
5. Save and forward, via email, the processing form and all supporting documentation to your unit commander, program director or immediate supervisor for review/approval.
6. On page 2, have either your unit commander, program director or immediate supervisor:
  - a. Print their name, rank/grade, title; sign and date the form in the approving authority's signature block or use an electronic signature.
7. Submit your completed form and all supporting documentation to the CRD for processing (59crdpubspres@us.af.mil). If you have any questions or concerns, please contact the 59 CRD/ Publications and Presentations Section at 292-7141 for assistance.
8. The 59 CRD/Publications and Presentations Section will route the request form to clinical investigations, 502 ISG/JAC (Ethics Review) and Public Affairs (59 MDW/PA) for review and then forward you a final letter of approval or disapproval.
9. Once your manuscript, poster or presentation has been approved for a one-time public release, you may proceed with your publication or presentation submission activities, as stated on this form. **Note:** For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.
10. If your manuscript is accepted for scientific publication, please contact the 59 CRD/Publications and Presentations Section at 292-7141. This information is reported to the 59 MDW/CC. All medical research or technical information publications/presentations must be reported to the Defense Technical Information Center (DITC). See 59 MDWI 41-108, *Presentation and Publication of Medical and Technical Papers*, for additional information.

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement:

*"The views expressed are those of the [author(s)] [presenter(s)] and do not reflect the official views or policy of the Department of Defense or its Components"*

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement for research involving humans:


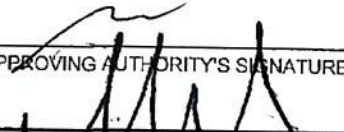
*"The voluntary, fully informed consent of the subjects used in this research was obtained as required by 32 CFR 219 and DODI 3216.02\_AFI 40-402."*

**NOTE:** All abstracts, papers, posters, etc., should contain the following disclaimer statement for research involving animals, as required by AFMAN 40-401\_IP :

*"The experiments reported herein were conducted according to the principles set forth in the National Institute of Health Publication No. 80-23, Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended."*



# PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

|   |  |   |  |   |  |   |  |
|---|--|---|--|---|--|---|--|
| 1. TO: CLINICAL RESEARCH  |  | 2. FROM: (Author's Name, Rank, Grade, Office Symbol)<br>Kevin Wu, CTR |  | 3. GME/GHSE STUDENT:<br><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO                                 |  | 4. PROTOCOL NUMBER:<br>NAVY15-09          |  |
| 5. PROTOCOL TITLE: (NOTE: For each new release of medical research or technical information as a publication/presentation, a new 59 MDW Form 3039 must be submitted for review and approval.)<br>Vascularized Composite Allotransplantation (VCA) in Swine (Sus scrofa) for Optimization of Reconstruction of Battlefield Injuries Using the  |  |   |  |   |  |   |  |
| 6. TITLE OF MATERIAL TO BE PUBLISHED OR PRESENTED:<br>Graft-Implanted Tacrolimus-Eluting Hydrogels Prolong Survival After Vascularized Composite AllograftsT  |  |   |  |   |  |   |  |
| 7. FUNDING RECEIVED FOR THIS STUDY? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO FUNDING SOURCE: AFMSA/ 59MDW ST   |  |   |  |   |  |   |  |
| 8. DO YOU NEED FUNDING SUPPORT FOR PUBLICATION PURPOSES: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO  |  |   |  |   |  |   |  |
| 9. IS THIS MATERIAL CLASSIFIED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO   |  |   |  |   |  |   |  |
| 10. IS THIS MATERIAL SUBJECT TO ANY LEGAL RESTRICTIONS FOR PUBLICATION OR PRESENTATION THROUGH A COLLABORATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA), MATERIAL TRANSFER AGREEMENT (MTA), INTELLECTUAL PROPERTY RIGHTS AGREEMENT ETC.? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO NOTE: If the answer is YES then attach a copy of the Agreement to the Publications/Presentations Request Form. |  |   |  |   |  |   |  |
| 11. MATERIAL IS FOR: <input type="checkbox"/> DOMESTIC RELEASE <input checked="" type="checkbox"/> FOREIGN RELEASE<br>CHECK APPROPRIATE BOX OR BOXES FOR APPROVAL WITH THIS REQUEST. ATTACH COPY OF MATERIAL TO BE PUBLISHED/PRESENTED.   |  |   |  |   |  |   |  |
| <input type="checkbox"/> 11a. PUBLICATION/JOURNAL (List intended publication/journal.)  |  |   |  |   |  |   |  |
| <input type="checkbox"/> 11b. PUBLISHED ABSTRACT (List intended journal.)   |  |   |  |   |  |   |  |
| <input type="checkbox"/> 11c. POSTER (To be demonstrated at meeting: name of meeting, city, state, and date of meeting.)  |  |   |  |   |  |   |  |
| <input type="checkbox"/> 11d. PLATFORM PRESENTATION (At civilian institutions: name of meeting, state, and date of meeting.)<br>Association of Surgeons of Great Britain and Ireland/ 11-13 May 2016  |  |   |  |   |  |   |  |
| <input type="checkbox"/> 11e. OTHER (Describe: name of meeting, city, state, and date of meeting.)  |  |   |  |   |  |   |  |
| 12. EXPECTED DATE WHEN YOU WILL NEED THE CRD TO SUBMIT YOUR CLEARED PRESENTATION/PUBLICATION TO DTIC<br>NOTE: All publications/presentations are required to be placed in the Defense Technical Information Center (DTIC).  |  |   |  |   |  |   |  |
| DATE<br>May 10, 2016  |  |   |  |   |  |   |  |
| 13. 59 MDW PRIMARY POINT OF CONTACT (Last Name, First Name, M.I., email)<br>Corpus Raul S, raul.s.corpus.ctr@mail.mil   |  |   |  |   |  | 14. DUTY PHONE/PAGER NUMBER<br>2105394404 |  |
| 15. AUTHORSHIP AND CO-AUTHOR(S) List in the order they will appear in the manuscript.   |  |   |  |   |  |   |  |
| LAST NAME, FIRST NAME AND M.I.  |  | GRADE/RANK  |  | SQUADRON/GROUP/OFFICE SYMBOL  |  | INSTITUTION (If not 59 MDW)               |  |
| a. Primary/Corresponding Author<br>Kevin Wu   |  | CTR   |  | 59MDW ST RESTOR   |  |   |  |
| b.<br>Renford Cindass   |  | O-3   |  | 59MDW ST RESTOR   |  |   |  |
| c.<br>Shari Lawson  |  | CTR   |  | 59MDW ST RESTOR   |  |   |  |
| d.<br>Mark Roth   |  |   |  |   |  | FHCRC                                     |  |
| e.<br>Vijay Gorantla  |  |   |  |   |  | UPITT                                     |  |
| f.<br>Michael Davis   |  | O-5   |  | 59MDW ST RESTOR   |  |   |  |
| I CERTIFY ANY HUMAN OR ANIMAL RESEARCH RELATED STUDIES WERE APPROVED AND PERFORMED IN STRICT ACCORDANCE WITH 32 CFR 219, AFMAN 40-401_IP, AND 59 MDWI 41-108. I HAVE READ THE FINAL VERSION OF THE ATTACHED MATERIAL AND CERTIFY THAT IT IS AN ACCURATE MANUSCRIPT FOR PUBLICATION AND/OR PRESENTATION.   |  |   |  |   |  |   |  |
| 16. AUTHOR'S PRINTED NAME, RANK, GRADE<br>Kevin Wu, CTR   |  |   |  | 17. AUTHOR'S SIGNATURE<br>               |  | 18. DATE<br>April 26, 2016                |  |
| 19. APPROVING AUTHORITY'S PRINTED NAME, RANK, TITLE<br>Michael R Davis, Lt Col, Director-RESTOR, Deputy Commander   |  |   |  | 20. APPROVING AUTHORITY'S SIGNATURE<br> |  | 21. DATE<br>April 26, 2016                |  |

# **PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS**

## **1st ENDORSEMENT (59 MDW/SGVU Use Only)**

TO: Clinical Research Division  
59 MDW/CRD  
Contact 292-7141 for email instructions.

22. DATE RECEIVED  
**4/26/2016**

23. ASSIGNED PROCESSING REQUEST FILE NUMBER  
**16194**

24. DATE REVIEWED  
**29 Apr 2016**

25. DATE FORWARDED TO 502 ISG/JAC

26. AUTHOR CONTACTED FOR RECOMMENDED OR NECESSARY CHANGES: ☒ NO ☐ YES If yes, give date. ☐ N/A

27. COMMENTS ☒ APPROVED ☐ DISAPPROVED

The presentation is approved. The presentation should receive a legal ethics review since it is being given to a foreign audience.

28. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER  
**Rocky Calcote, PhD, Clinical Res. Administrator**

29. REVIEWER SIGNATURE  
CALCOTE.ROCKY.D.1178245844  
Digitally signed by CALCOTE.ROCKY.D.1178245844  
DN: cn=US, ou=US Government, ou=OSD, ou=AF, ou=USAF,  
ou=CALCOTE.ROCKY.D.1178245844  
Date: 2016.04.29 07:22:22 -0500

30. DATE

## **2nd ENDORSEMENT (502 ISG/JAC Use Only)**

31. DATE RECEIVED

32. DATE FORWARDED TO 59 MDW/PA

33. COMMENTS ☐ APPROVED (In compliance with security and policy review directives.) ☐ DISAPPROVED

34. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER

35. REVIEWER SIGNATURE

36. DATE

## **3rd ENDORSEMENT (59 MDW/PA Use Only)**

37. DATE RECEIVED  
**6 May 2016**

38. DATE FORWARDED TO 59 MDW/SGVU  
**6 May 2016**

39. COMMENTS ☒ APPROVED (In compliance with security and policy review directives.) ☐ DISAPPROVED

40. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER  
**Christopher Carwile, TSgt/E-6, NCOIC, PA**

41. REVIEWER SIGNATURE  
CARWILE.CHRISTOPHER.STEWART.1280477229  
Digitally signed by  
CARWILE.CHRISTOPHER.STEWART.1280477229  
DN: cn=US, ou=US Government, ou=OSD, ou=AF, ou=USAF,  
ou=CARWILE.CHRISTOPHER.STEWART.1280477229  
Date: 2016.05.06 11:15:14 -0500

42. DATE  
**6 May 2016**

## **4th ENDORSEMENT (59 MDW/SGVU Use Only)**

43. DATE RECEIVED

44. SENIOR AUTHOR NOTIFIED BY PHONE OF APPROVAL OR DISAPPROVAL  
☐ YES ☐ NO ☐ COULD NOT BE REACHED ☐ LEFT MESSAGE

45. COMMENTS ☐ APPROVED ☐ DISAPPROVED

46. PRINTED NAME, RANK/GRADE, TITLE OF REVIEWER

47. REVIEWER SIGNATURE

48. DATE





# Graft-Implanted Tacrolimus-Eluting Hydrogels Prolong Survival After Vascularized Composite Allografts

**Kevin Wu, Renford Cindass, Shari Lawson Jerry R Spencer, Mark Roth,**

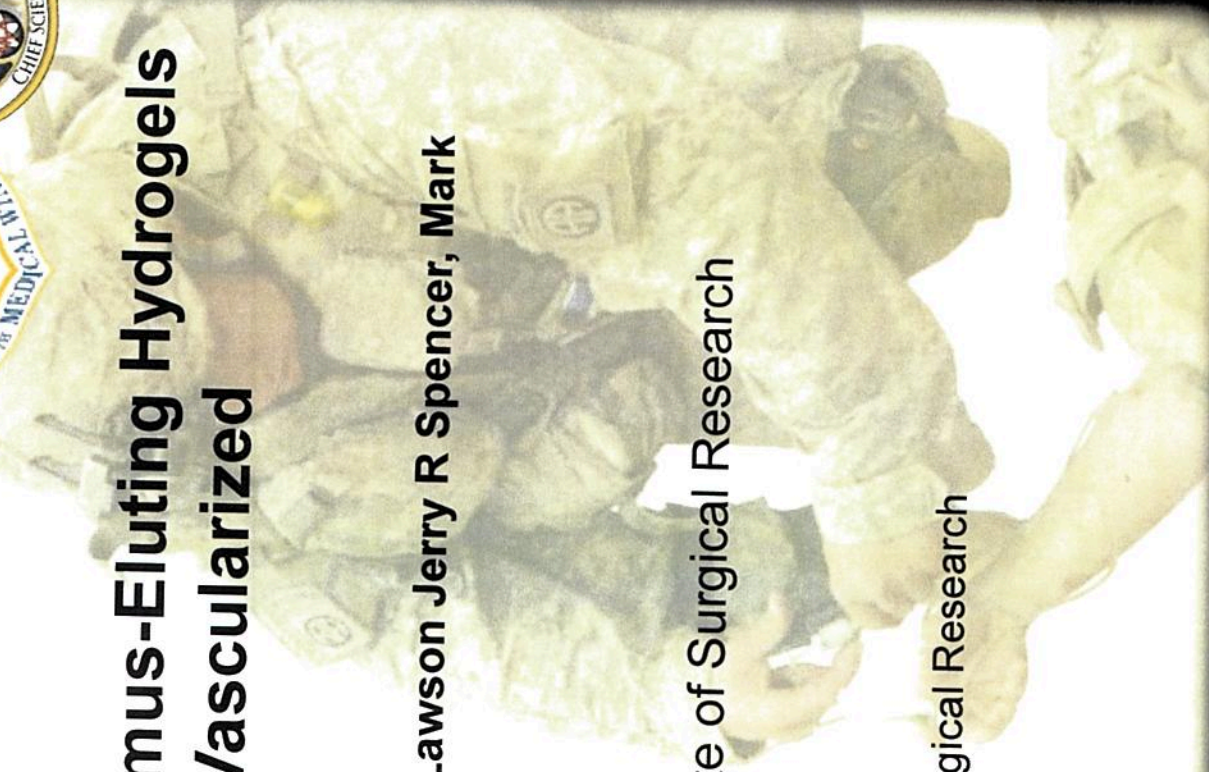
**VS Gorantla, Michael R Davis**

**Kevin Y. Wu, MD**

**Research Fellow, US Army Institute of Surgical Research**

**Lt Col Michael R. Davis, MD, FACS  
RESTOR Program**

**Deputy Commander, USA Institute of Surgical Research  
59MDW Science and Technology Office  
San Antonio, TX, USA**







# Disclaimer

The views expressed are those of the authors and do not reflect the official view or policy of the Department of Defense, Department of the Army, Department of the Air Force or its Components.

The experiments reported herein were conducted according to the principles set forth in the National Institute of Health Publication 80-23, Guide for the Care and Use of Laboratory Animals and the Animal Welfare Act of 1966, as amended



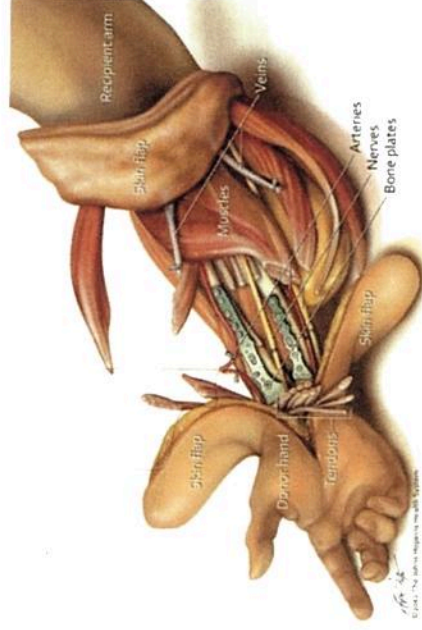
# Vascularized composite allotransplantation (VCA)







# Current limitations to vascularized composite allotransplantation (VCA)



Little evidence that vascularized composite allotransplantation improves limb function or quality of life in patients with limb loss

Wang et al. JAMA 2014;311:1001-1010

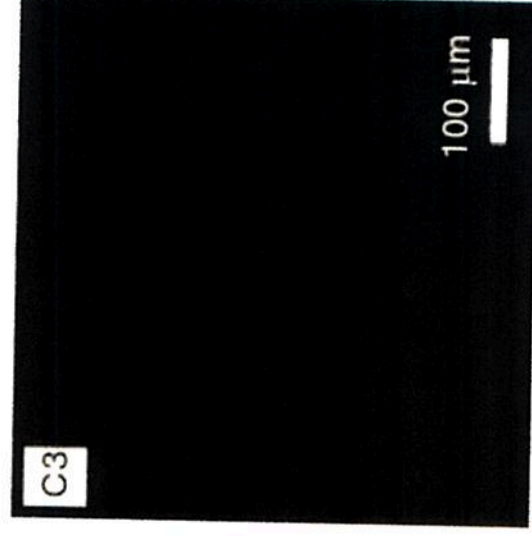
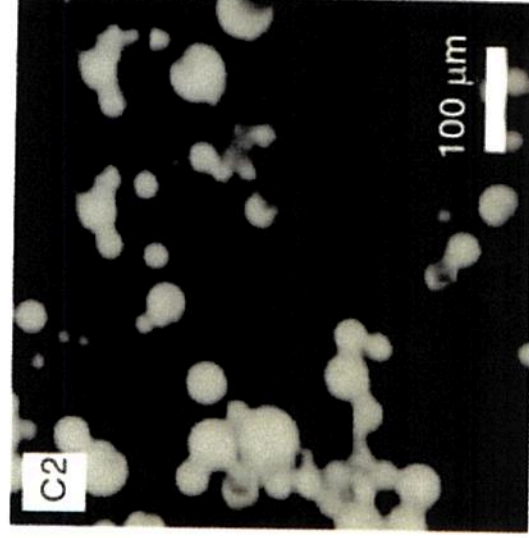
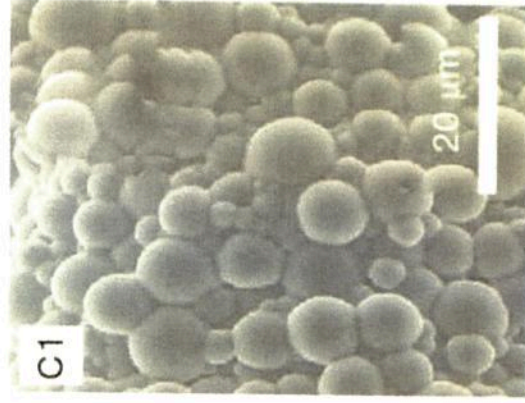
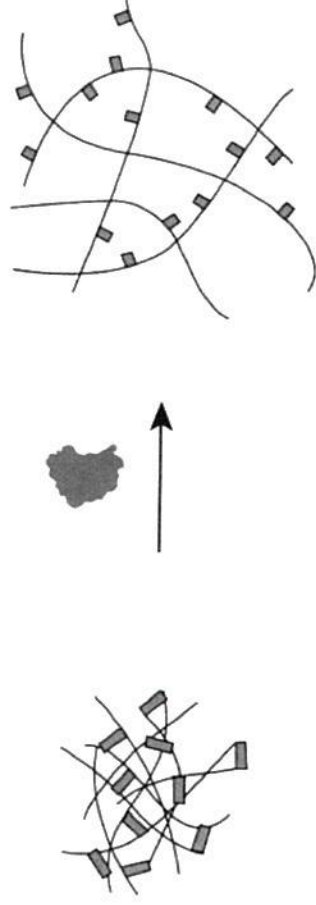
- Requires systemic immunosuppression
- Skin is a primary target for rejection
- Limited donor pool
- Shorter period for ischemia time
- Ischemic reperfusion injury





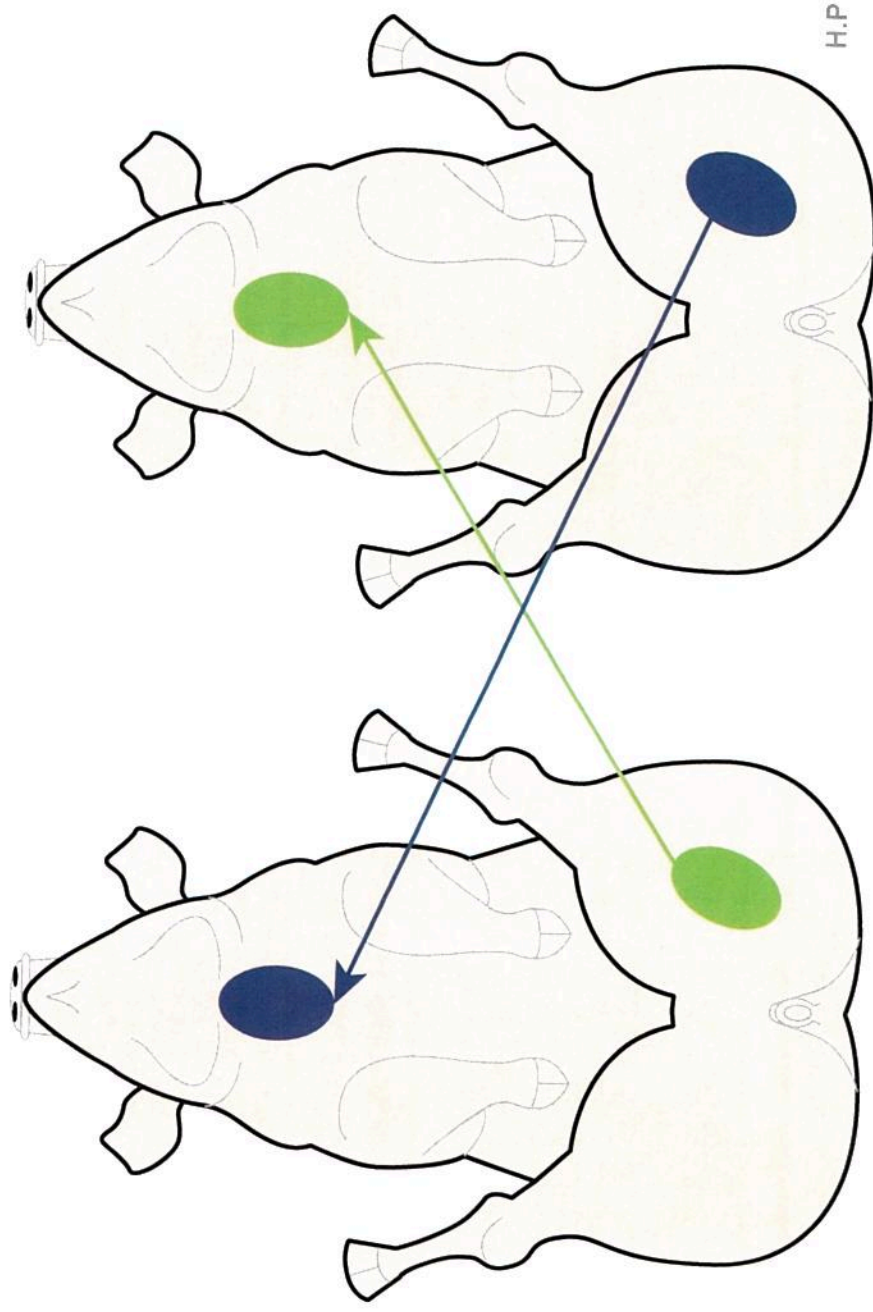
# Enzyme Activated Drug Eluting Hydrogel

Enzymatic degradation





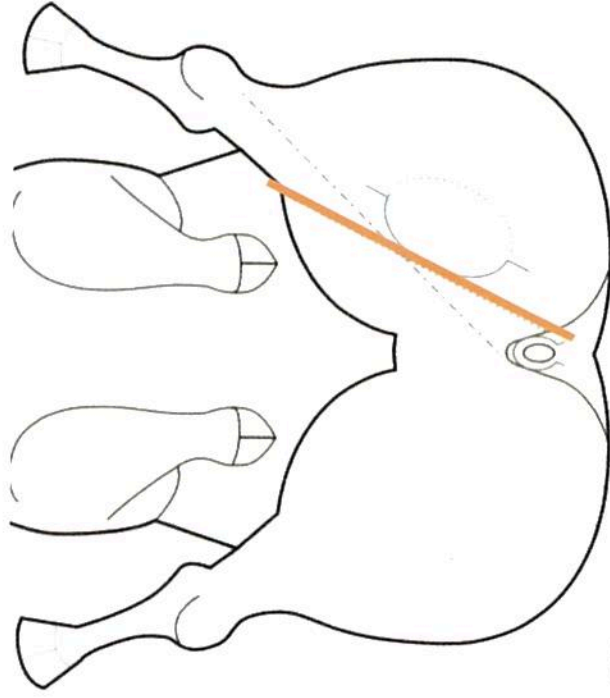
# Allotransplantation



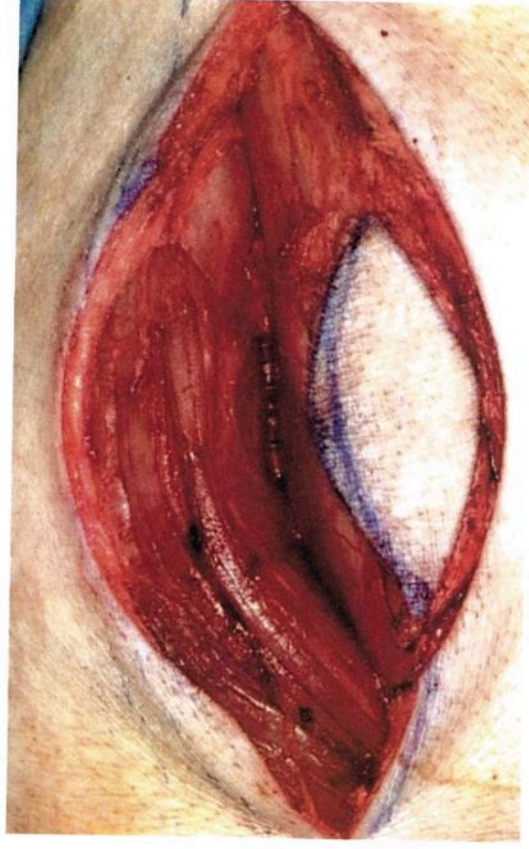




# Gracilis myocutaneous VCA model



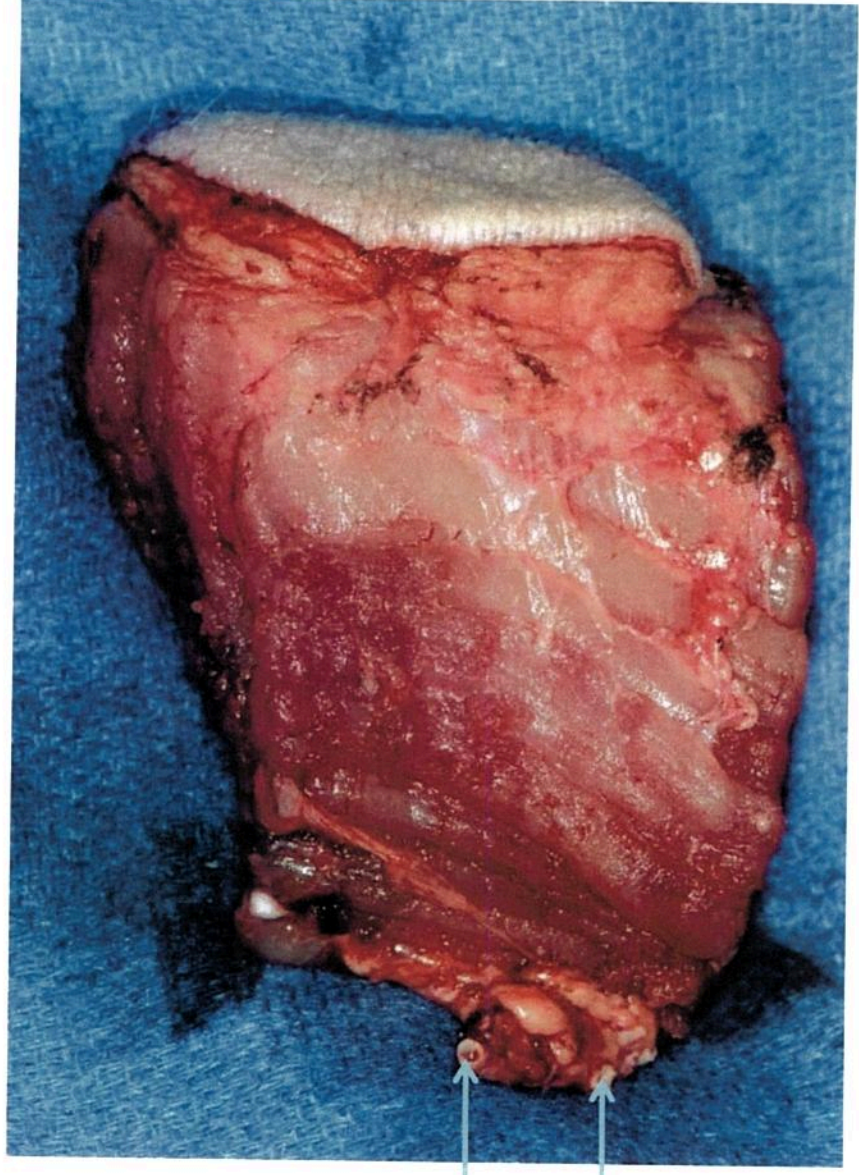
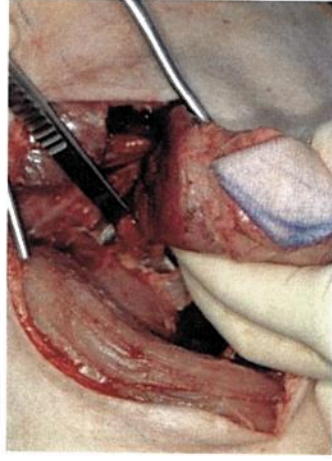
H.P







# Gracilis myocutaneous VCA model



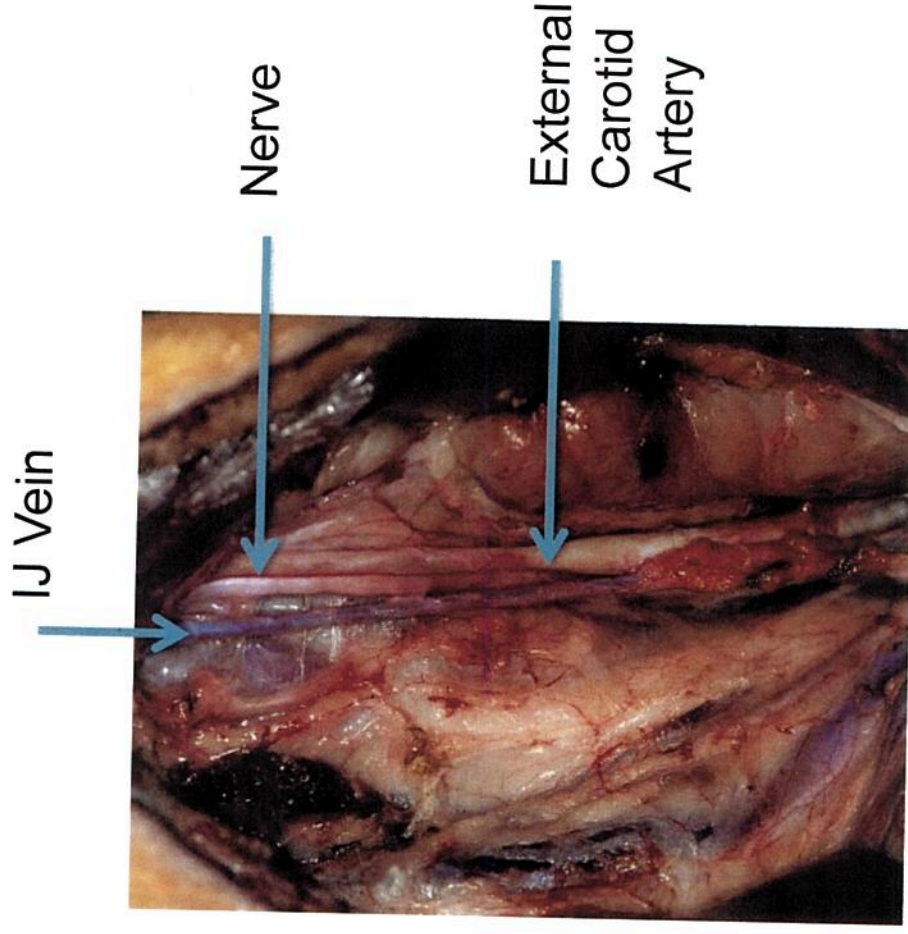
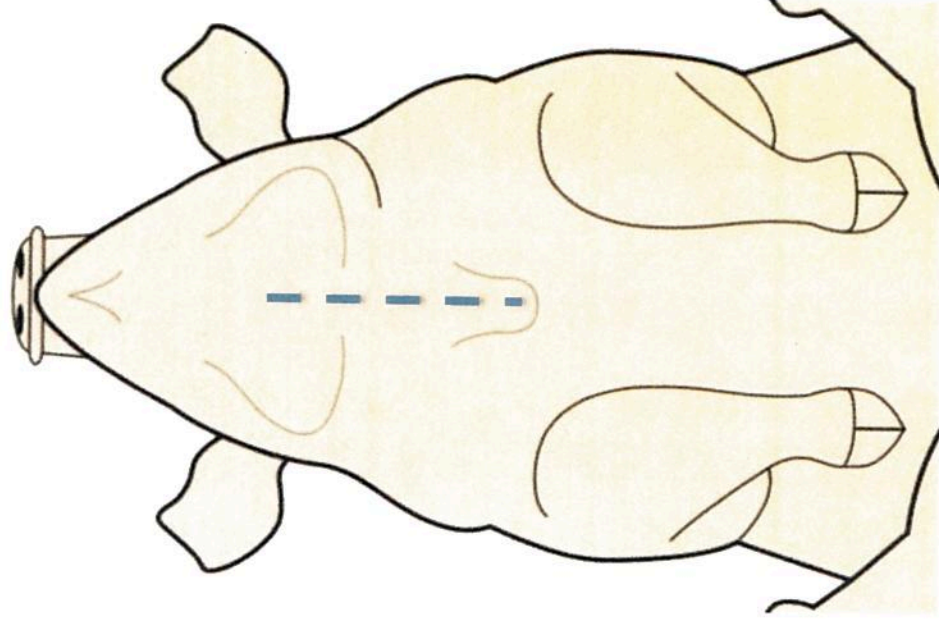
Artery

Vein





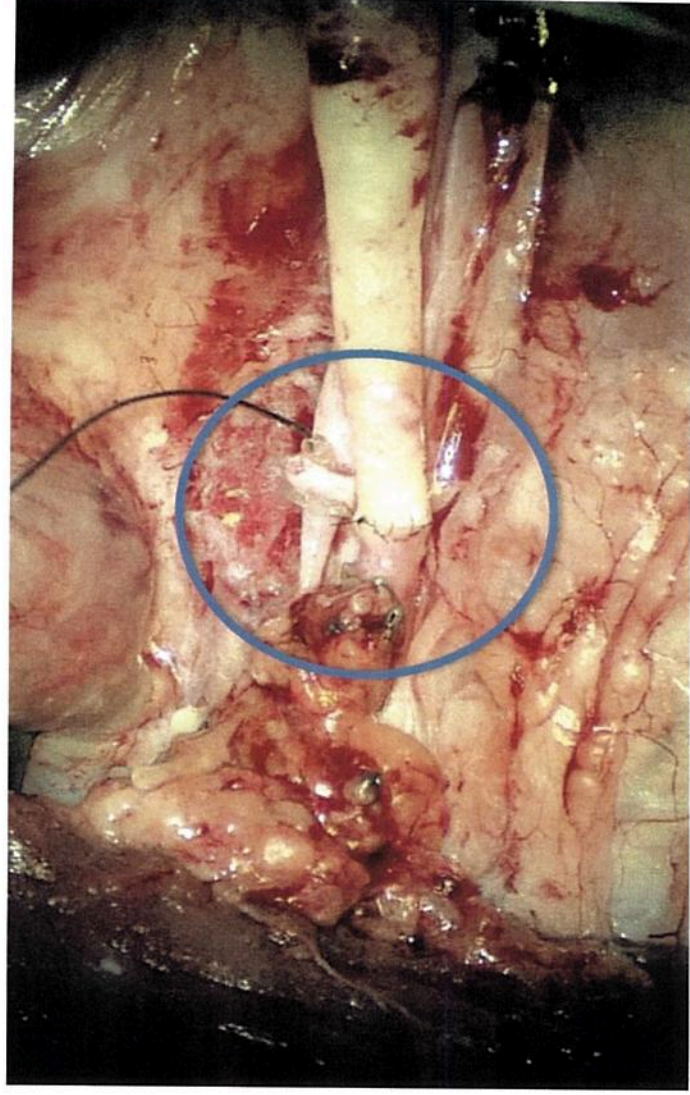
# Gracilis myocutaneous VCA model







# Gracilis myocutaneous VCA model



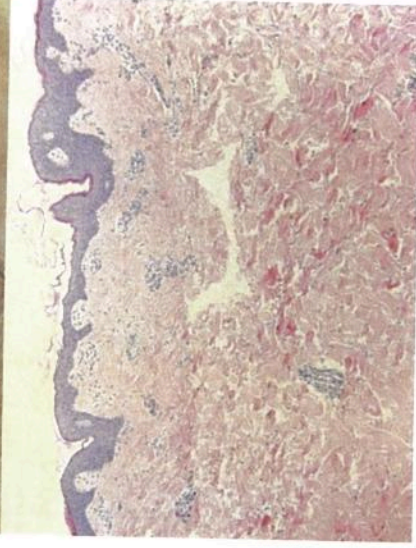




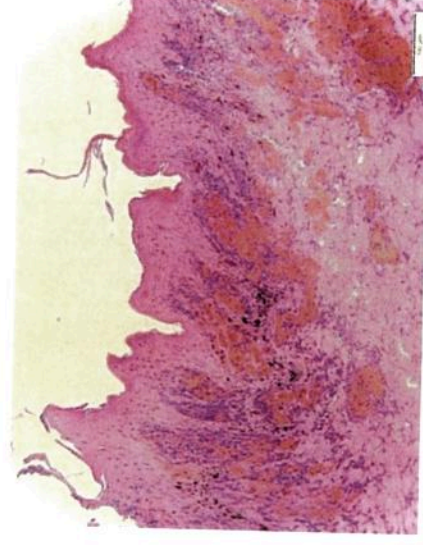
# Methods

- Heterotopic gracilis myocutaneous flap VCA was performed between swine donor-recipient pairs with a single swine leukocyte antigen (SLA) mismatch.
- 2 Groups
  - Group 1 (controls, n=8) received no drug intervention.
  - Group 2 (experimental, n=3), a tacrolimus-eluting hydrogel (28 mg in 4 cc) was injected subcutaneously into the donor flap immediately before end of ischemia time.
- Post-operative period
  - 4-mm punch biopsy every 1-3 days for 23 days
  - Blinded histologic examination using Banff working classification

# Results



Grade 0

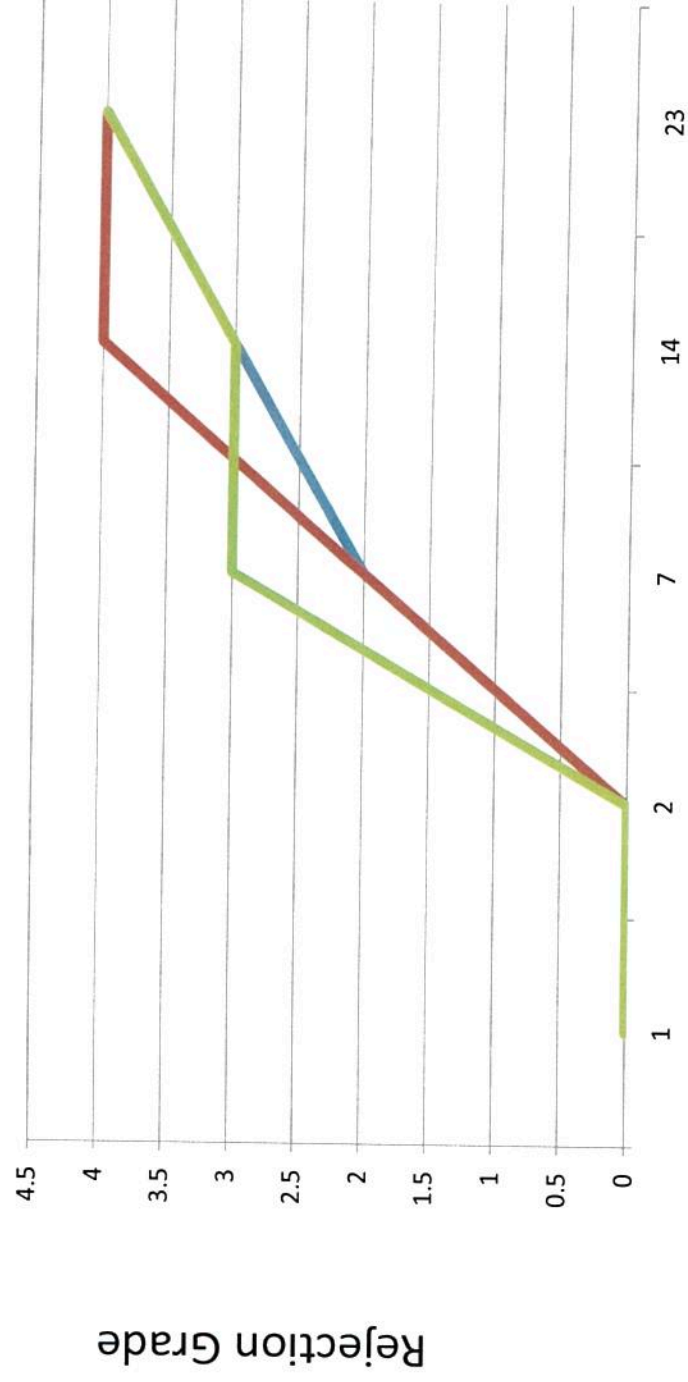


Grade 4





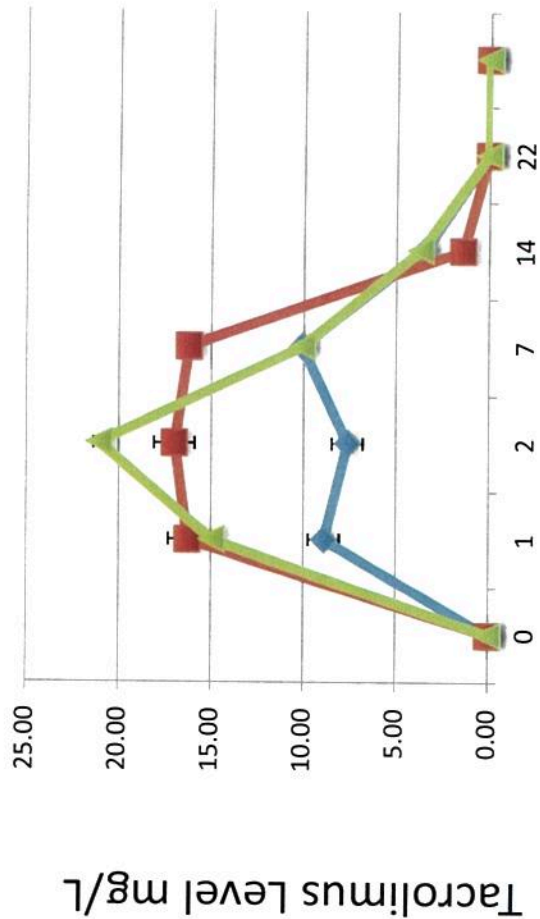
# Time to rejection



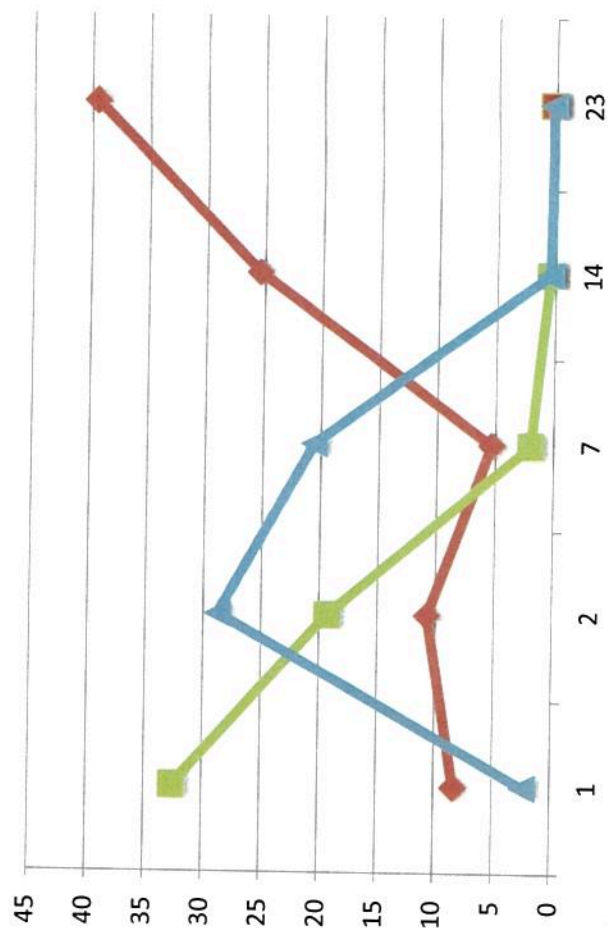
Post-op Days



Tacro Blood Level



Tacro Tissue Level



Post-op Days





# Conclusions

- Swine gracilis myocutaneous flap is a reliable and consistent animal model for studying VCA rejection
- Analysis of gel exhaustion related to the inflammatory and acute rejection process aids in timing and dosage of the subsequent reload of the gel
- Hydrogels are able to delay the onset of acute rejection regionally and without clinically detectable systemic levels of tacrolimus

Thank You

